Management Practice Considerations for Nitrogen and Phosphorus

Nitrogen Best Management Practices for South-Central Minnesota

- Adjust nitrogen rate according to soil organic matter content, previous crop and manure applications
- Use a soil nitrate test where appropriate
- Use prudent manure management to optimize nitrogen credit
  1. Injection of manure is preferable, especially on strongly sloping soils
  2. Avoid manure application to sloping, frozen soils
  3. Incorporate manure applications whenever possible
- Plan nitrogen application timing to achieve high efficiency of nitrogen use
  1. Applications of nitrogen before spring planting are highly recommended
  2. If some nitrogen is to be fall-applied, delay application until the soil temperature is below 50^{o} F at a 6-inch depth. Anhydrous ammonia is encouraged if fall applications are made
  3. Spring preplant applications of anhydrous ammonia or urea are encouraged. Broadcast urea and preplant application of UAN should be incorporated within three days of application
  4. Apply sidedress applications to corn before it is 12 inches high
  5. Inject or incorporate sidedress applications of urea and UAN to a minimum depth of 4 inches
  6. Use a nitrification inhibitor with fall and preplant nitrogen applications if soils are poorly drained and soil moisture levels are high near the surface
  7. Carefully manage nitrogen applications on soils characterized by a high leaching potential

Phosphorus Management Practices

- When possible apply manure at rates which satisfy crop phosphorus needs (recommended University of Minnesota rates or crop P removal) instead of crop nitrogen needs on fields testing high in phosphorus. This will prevent long-term buildup.
- Subsurface band or row apply commercial phosphorous fertilizer
- Immediately incorporate broadcast commercial fertilizer
- Control soil losses and runoff to levels considered safe for the soil resource; control to lower levels when fields have very high to excessive soil test phosphorus levels
  1. Control sheet and rill losses by installing conservation practices including conservation tillage, contour farming, strip cropping, terraces and cover crops
  2. Control ephemeral erosion by installing water and sediment control basins, waterways and diversions

Additional Manure Application Considerations

- Use a cover crop for summer applied manure to fallow ground or early harvested crops (Required by MPCA rules)
- Apply manure to:
  1. All available acres
  2. Land that is the furthest from surface waters
  3. The flattest ground
  4. Fields with the least amount of runoff and erosion
  5. Fields testing lowest in phosphorus
- Avoid manure applications when precipitation causing runoff is likely within 24 hours
- Inject or incorporate manure applications within 24 hours
- Eliminate applications when ground is frozen, snow covered or actively thawing
- Consider agronomic, nutritional and managerial practices which reduce the amount of nitrogen and phosphorous excreted by animals including:
  1. Using high quality protein sources
  2. Feeding low protein, amino acid supplemented diets
  3. Avoiding excessive overages of dietary P
  4. Balancing diets on an available P basis
  5. Using feed ingredients that possess highly available P
  6. Using enzyme additives such as phytase to improve ability to utilize P in rations